

REMARKS

Claims 1-3, 5-38 and 39-60 are pending in this application. In the Office Action, claims 1-3, 5-7 and 38 were rejected under 35 U.S.C. § 102(e) as allegedly anticipated by, or alternatively under 35 U.S.C. § 103(a) as obvious over, U.S. Patent No. 6,503,376 ("Toyoda"). Claims 5-11, 23 and 40-50 were rejected under 35 U.S.C. § 112, ¶2, as allegedly being indefinite. Claims 8-11 were objected to as being dependent from a rejected base claim, but the Office Action indicated that the claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 12-22 and 24-37 were allowed.

The foregoing rejections are respectfully traversed, in part, for reasons including those set forth below and during a telephonic interview with the Examiner on October 15, 2004. Applicants' attorney reserves the rights to set forth additional arguments regarding the art cited in the Office Action and to submit evidence of prior invention by the Applicants.

Claim Rejections under 35 U.S.C. § 112

Claims 5, 6 and 40 have been amended and no longer depend from cancelled claims. Accordingly, there is now an antecedent basis for the term "compartment" in claim 50. The word "type" has been deleted from claim 23; the claim now recites a "mushroom-shaped" delivery nozzle, e.g., as described in the specification at page 13, line 16.

Claim Rejections Under 35 U.S.C. § 102 and 103

Independent apparatus claims 1 and 12 recite a diffuser membrane that "creates a flow pattern such that the plating fluid exits the diffuser membrane at substantially the same velocity across the entire surface of the diffuser membrane." Similarly, independent method claim 38 recites the step of "pumping the plating fluid into said compartment such that the plating fluid exits the compartment through the diffuser membrane at substantially the same velocity across the entire surface of the diffuser membrane."

The Office Action states that the filter of Toyoda "appears to 'create' a flow pattern, which is 'substantially' the same velocity across the entire surface of the filter 12A." (*Id.* at p. 3, ¶1.) This statement is respectfully traversed.

As understood and as discussed with the Examiner today, Toyoda simply does not address the issue of providing a uniform velocity of plating fluid across the surface of a diffuser

membrane. The Toyoda patent addresses the problem of "removing oxygen generated at the insoluble anode." The abstract of the Toyoda patent is as follows:

The electroplating apparatus includes a substrate disposed above an insoluble anode and a filter disposed between the insoluble anode and the substrate for removing oxygen generated at the insoluble anode. This plating apparatus using an insoluble anode allows easy placement and removal of the substrate and prevents poor deposition and poor filling caused by accumulation, on the substrate, of oxygen generated at the insoluble anode.

Even if the filter of Toyoda were otherwise comparable to the diffuser membrane of the present invention (which Applicants' attorney does not concede), Toyoda would still not teach, suggest or indicate this recitation of each independent claim in the present application. In particular, there is no indication that plating fluid exits the filter of Toyoda at substantially the same velocity across the surface of the filter.

For example, the filter shown in Fig. 2 of Toyoda is described as follows:

The filter 12A has a filter body 12, and a plurality of openings 13 are circumferentially disposed in an outer peripheral region of the filter body 12. By disposing the openings 13, the oxygen captured by the filter body 12 can be removed to the outside through the openings 13. If the oxygen is not removed, the oxygen will be accumulated on the filter body 12, whereby the electric field distribution and the electrolyte flow will be disturbed to cause poor film thickness distribution. As a result, problems will be raised such as poor reproducibility of film forming.

(Id. at col. 5, lines 28-37.)

The filter of Toyoda has an oxygen outlet, which is provided by openings 13 in this instance:

In order to remove oxygen with certainty, the openings 13 are disposed outside of the insoluble anode 10. In order to prevent the removed oxygen from returning to the substrate 4 side, the openings 13 are disposed outside of the substrate 5. Further, the filter body 12 is disposed to have a shape sloped upwards (an inverted conical shape) as viewed from the central part to the outer peripheral part of the filter body

12. The oxygen captured by the filter body 12 is guided smoothly to the openings 13 by this slope. The slope angle (angle of elevation) of the filter body 12 relative to the horizontal direction is about 20 degree. Further, the filter body 12 is made of PTFE, and has a mesh diameter (roughness) of about 1 μm .

(Id. at col. 5, lines 38-50.)

Some of the filters described in Toyoda are flat and some are conical, but as understood by Applicants' attorney, all have some type of opening/oxygen outlet 13 and/or 13a. These openings may be in the center and/or circumferentially disposed as a series of slots formed at a particular radius. (See Figs. 2, 4, 8, 10 and 15.) Openings 13 and 13a are much larger than the size of the openings in the mesh filter body 12.

As understood, because openings 13 and 13a are much larger than those in the mesh of the filter body, this differential in size would produce an uneven velocity distribution in both radial and circumferential directions. Although this issue is not addressed in the Toyoda description, it seems clear that the plating fluid passing through a larger opening would encounter less resistance and therefore move faster. It also seems likely that turbulence could be established in the vicinity of the openings 13. Moreover, because the oxygen bubbles are being preferentially directed to these openings, the bubbles may also cause local variations in the velocity field.


The Office Action also suggests that the flow rate recited in Toyoda "appears to define a velocity." (Id. at p. 3, ¶1.) However, such references to the plating fluid flow rate do not address whether the plating fluid velocity is uniform across the surface of Toyoda's filter. It seems apparent that it would not be uniform.

Finally, the Office Action states: "If not shown by the reference, then the claims would be considered an obvious modification thereof" (Page 3, ¶ 4.) However, the motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. See, e.g., Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573, 37 U.S.P.Q.2d 1626, 1630 (Fed. Cir. 1996). Merely stating that the claim recitations are "obvious modifications" does not establish a *prima facie* case of obviousness. Here, Toyoda does not suggest the desirability or incentive to make the plating fluid exit the diffuser membrane at substantially the same velocity across the entire surface of the diffuser membrane.

CONCLUSION

Applicants' attorney believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. If the Examiner has any remaining doubt that all pending claims are allowable, Applicants' attorney requests that the Examiner contact the undersigned at the telephone number set out below.

Respectfully submitted,
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